Detailed Characterization and Depositional Drivers of a Siliciclastic Source-Rock: An Example from the Early Jurassic of the North Sea Basin

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Abstract

In contrast to what is often assumed, marine source rock intervals can be very heterogeneous in terms of composition and properties, both on a lateral and vertical scale. This variability is caused by changes in the depositional environment such as run-off, surface-water productivity and bottom-water ventilation and oxygenation, which in turn control source rock parameters like the organic-carbon content and composition, mineralogy and physical properties. In order to spatially predict the distribution of prosperous properties, a detailed understanding of the depositional environment in a paleogeographic context is required. We here present an example of the application of a novel multidisciplinary work-flow, focusing on a Lower Toarcian (Early Jurassic) source rock from NW-Europe (Posidonia Shale Fm.). This example illustrates the capacity to identify and predict heterogeneous trends in source-rock properties. We conclude with a discussion of common characteristics and differences of prominent organic-rich rock-units in the Middle East.